C. REMARKS

1. Status of the Claims

Claims 1-23 were pending in the application. Claims 22 and 23 have been canceled, and therefore are not discussed below. With this cancellation, claims 1-21 are currently pending.

Claims 1, and 21 are independent. Claims 2-20 depend on claim 1.

2. Rejection of Claims 1-21 Under 35 U.S.C. 112, first paragraph

Claims 1-21 have been rejected, under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. Applicant respectfully traverses.

i) "a film formed of a plurality of molecules"

Regarding this limitation, the Examiner states:

With respect to item i) above, review of the originally filed specification fails to provide guidance as to any specific substances which have the ability to generate a signal in response to interacting with a "microorganism" that has been excited to interact with the film of molecules. The specification does recite that the molecules can be "conjugated polymer molecules" but again fails to set forth specific molecules that would be capable of functioning as recited in the claim and/or that would be known to one of ordinary skill in the art at the time of filing the instant invention.

Applicant responds that, on the contrary, the specification does clearly set forth very specific types of molecules, namely conjugated polymers, as being capable of functioning as recited in the claims.

"Conjugated polymer molecules," as set forth by the applicant, are widely known in the art, and in particular are very well known to be molecules that are capable of specifically functioning as recited in claim 1, in contrast to the Examiner's comments. As well known in the art, conjugated polymers are molecules that have a framework for alternating single and double carbon-carbon or carbon-nitrogen bonds, and that have a

single bond backbone of overlapping sp^2 hybrid orbitals. Conjugated polymers, which by definition have the above-described specific type of molecular structure, can give rise to binding events with microorganisms such as bacteria, when the bacteria are optically excited. These binding events, in turn, give rise to fluorescent emissions.

All of the above-described facts regarding conjugated polymers are very well known in the art, and are well within standard knowledge of one of ordinary skill in the art. In fact, this type of information can be found e.g. in textbooks. "[A] patent need not teach, and preferably omits, what is well known in the art." Hybritech Inc. v. Monoclonal Antiboides, Inc., 802 F.2d 1367, 1384 (Fed. Cir. 1986). There is no need to describe in the specification all of these properties of conjugated polymer molecules (which are extremely well known in the art to the point of being textbook material) in order to meet the requirements of 35 USC 112 first paragraph.

ii) "a sample fluid having a plurality of microorganisms"

Regarding this limitation, the Examiner states:

"*With respect to item ii) above, review of the originally filed specification indicates that the claim language "microorganism" encompasses a wide range of potential analytes including biological and chemical agents, such as TNT.*"

Applicant responds that Applicant's specification provides, in exact and clear terms, a description of the term "microorganisms". See e.g. Applicant's specification page 12, lines 17-21: "*The plurality of organisms 248 that fill the sample fluid 246 may be biological microorganisms, such as bacteria, antibodies, cells, and proteins. In the embodiment illustrated in Figures 3 (a) and 3 (b), the organisms 248 are bacteria. Alternatively, the organisms 248 may be chemical microorganisms, such as inorganic molecules including TNT.*")

Applicant submits that, as seen from the passages quoted above, Applicant's specification does provide an enabling disclosure of this limitation ("*a sample fluid having a plurality of microorganisms*"), and therefore that this limitation meets the

requirements of 35 USC 112 ¶1.

iii) "the microorganisms interact with at least one of the molecules in response to excitation light so as to generate or create a fluorescent signal."

Regarding this limitation, the Examiner states, *inter alia*:

" *the specification fails to provide guidance as to any specific combination of "microorganism", excitation light and film molecule that would provide the signal generation of fluorescent light required of the instant claims.*"

Applicant disagrees.

Applicant submits that, on the contrary, the specification provides ample guidance to how a fluorescent signal is generated, by fully describing in clear and exact terms that when bacteria (i.e. microorganisms) are excited by excitation light, a binding event between the bacteria and the conjugated polymer molecules (which form the film of molecules that coat the internal surface of the PBG) generates a fluorescent signal.

See e.g. specification pg. 11, lines 21-23; pg. 12, lines 2-5 and 21-23; and pg. 13, lines 1-4 (". . . ***In response to the excitation light 252, the organisms 248 within the sample fluid 246 interact with the molecules that form the film 240 so as to generate a fluorescent signal.*** *In a preferred embodiment, the interaction is a* ***binding event.*** *. . . the film 240 is a conjugated polymer biosensing film, formed of conjugated polymer biosensor hybrid molecules. It is advantageous to use conjugated polymer films, because* ***a binding event can cause many of the polymerized sites in a conjugated polymer film to fluoresce.*** *. . . In response to the excitation light 252 generated by the optical source 250,* ***the bacteria 248 interact with the molecules forming the film 240, so as to generate a fluorescent signal.*** . . .)

As seen from these representative passages, the specification explicitly describes, in clear and exact terms, that optical excitation of bacteria dispersed in the sample fluid results in a binding event between the bacteria and the film of conjugated

polymers coating the interior surface of the photonic band gap structure, and that such a binding event causes fluorescence. The fact that a binding event between bacterial microorganisms and conjugated polymer molecules result in generation of fluorescent signals is very widely known, and certainly by one of ordinary skill in the art.

Accordingly, Applicant's specification very clearly and exactly describes the mechanism for generating and detecting fluorescence. Contrary to the Examiner's statement, no undue experimentation is required by anyone of ordinary skill in the art, because one of ordinary skill in the art knows very well, as a matter of course, that it is standard practice well known in the art to cause binding events between bacterial microorganisms and conjugate polymer molecules in order to generate fluorescence.

Further, the Examiner states:
"*The reference of Grey et al. is drawn to the detection of TNT while the reference of Ligler et al. is drawn to the detection of microbiological agents. Neither of these references convey to one of ordinary skill in the art that either of the detected analytes "interact" with a film of molecules 'in response to an excitation light'*."

Applicant wholly agrees with the above statements by the Examiner.

Applicant notes, however, that neither Grey nor Ligler is mentioned anywhere in Applicant's specification and/or claims. It goes without saying that Applicant has never relied on either Grey or Ligler as any support for Applicant's claims. Therefore, the Examiner's discussion of Grey and Ligler, in conjunction with a 35 USC 112 ¶1 rejection of Applicant's claims, is misplaced and irrelevant.

Applicant concludes that the Examiner's comments quoted above regarding Grey and Ligler, while true, has no bearing at all upon whether or not Applicant's claims satisfy the enablement requirement of 35 USC 112 first paragraph: neither Applicant's claims nor Applicant's specification contain the slightest reference to Grey or to Ligler, much less any reliance on either Grey or Ligler for support.

For all of the reasons above, claims 1-21 satisfy the requirements of 35 U.S.C. 112, first paragraph.

3. **Rejection of Claims 1-21 Under 35 U.S.C. 112, second paragraph**

The Examiner states:

"*Claims 1-23 are indefinite for the following reason. It is not clear what is responsive to the recited excitation light. Does the excitation light cause the microorganisms to "interact" with the film molecules or is the excitation light merely being used to generate a fluorescence emission from fluorescence emitting entities within the detection device. Does this "interaction" differ from the prior art discussed on pages 1, 2 and 7 of the instant specification? Clarification and/or correction is requested.*" Applicant respectfully traverses.

Applicant responds that claims 1-21 are not indefinite, because to one of ordinary skill in the art it is perfectly clear, just from the claim language itself, what is responsive to the excitation light: namely, the microorganisms are what is responsive to excitation light. As clearly stated in the claims, and as clearly and exactly stated and described multiple times in the specification, the microorganisms respond to excitation light, by binding with the conjugated polymer molecules.

Applicant thus disagrees with the Examiner's comments that "*it is not clear what is responsive to the recited excitation light*". The claim language states, very clearly and explicitly, that **the microorganisms** are responsive to excitation light. Specifically, Claim 1 unambiguously states: ". . . *in response to said excitation light, at least one of said plurality of microorganisms is capable of interaction with at least one of said plurality of molecules so as to generate a fluorescent signal . . .*"

With such an explicit statement, there is no room for doubt. There is nothing indefinite about such language. It is unmistakably clear that what is responsive to the excitation light is "at least one of said plurality of microorganisms", which interacts with the molecules in response to said excitation light. This is self-evident, not only from the

unambiguous recitation in claim 1 itself, but also from numerous passages in the specification (see quotations above) that explain and describe such an interaction of the microorganisms. Anyone with even a rudimentary knowledge of the mechanism of fluorescence generation and detection understands that the microorganisms are the ones that respond to excitation light, by binding to the conjugated polymers, something which is part of standard knowledge for one of ordinary skill in the art.

For these reasons, claims 1-21 are not indefinite under 35 U.S.C. 112, second paragraph.

4. Rejection of Claims 1, 3-9, and 11-20 Under 35 U.S.C. § 103 (a)

Claims 1, 3-9, and 11-20 stand rejected under 35 U.S.C. § 103 (a) as being unpatentable over U.S. Pat. No. 5,157,261 to Grey et al. ("Grey") in view of published PCT Application WO 99/64903 to Broeng et al. ("Broeng"). Applicant respectfully traverses.

Applicant submits that, for the reasons discussed in detail below, the Examiner has failed to establish a *prima facie* case of obviousness of claims 1, 3-9, 11-20 over Grey in view of Broeng, and therefore that the Examiner has failed to meet his initial burden of proof. See MPEP 2142 ("The examiner bears the initial burden of factually supporting any *prima facie* conclusion of obviousness. If the examiner does not produce a prima facie case, the applicant is under no obligation to submit evidence of nonobviousness.")

It is well known that, in order to establish a *prima facie* case of obviousness, a rejection must satisfy at least the following:

A) The prior art reference(s) must teach or suggest all of the elements and limitations recited in the claims; and

B) There must be some suggestion, teaching, or motivation to combine the references on which the rejection is based.

See MPEP 2142.

The Examiner's rejection of claims 1, 3-9, and 11-20 over Grey in view of Broeng satisfies neither A) nor B).

A) The Documents cited by the Examiner (Grey and Broeng), Either Alone or in Combination, Fail to Teach or Suggest All of the Elements of Claims 1, 3-9, and 11-20

Applicant submits that Grey and Broeng, either alone or in combination, fails to teach or suggest a photonic band gap structure having an internal surface coated with a film formed of a plurality of molecules, the internal surface defining a core region containing a sample fluid in which a plurality of microorganisms are dispersed. Grey and Broeng (either alone or in combination) also fails to teach or suggest that, in response to excitation light, these microorganisms are capable of interacting with the plurality of molecules so as to generate a fluorescent signal, and that the photonic band gap structure is further adapted to guide the fluorescent signal (that has been generated) through the core region and onto the detector.

The Examiner has acknowledged that Grey does not teach a photonic band gap structure with an internal core region that contains a sample fluid and that is coated with molecules. ("*The above claims [1, 3-9, and 11-20] differ [from Grey] by reciting the use of a photonic band gap structure with an internal core region for supporting the coated molecules wherein the sample fluid is contacted or contained within the core region*").

Applicant also notes with appreciation that the Examiner also acknowledged that Grey does not convey to one of ordinary skill in the art that the analytes being detected interact with a film of molecules in response to an excitation light. See Office Action p. 3 line 22 – p. 4 line 4: "*The reference of Grey et al. is drawn to the detection of TNT while the reference of Ligler et al. is drawn to the detection of microbiological agents. Neither of these references convey to one of ordinary skill in the art that either of the detected analytes "interact" with a film of molecules 'in response to an excitation light'.*"

Broeng fails to cure the above-listed deficiencies (which were acknowledged by

the Examiner) of Grey. In particular, Broeng neither teaches nor suggests that the core region of the photonic band gap structure contain microorganisms capable of interacting with any of the molecules of a thin film coating the internal surface of the photonic band gap structure, so as to generate a fluorescent signal. Broeng also fails to teach or suggest that a photonic band gap structure be adapted to guide a fluorescent signal, which generated by an interaction between at least one microorganism and at least one molecule of the thin film coating the interior surface of a photonic band gap fiber, through a core region of the photonic band gap structure and onto an optical detector.

For these reasons, Applicant concludes that the proposed combination of Grey and Broeng fails to teach or suggest many limitations of independent claim 1, in particular fails to teach or suggest a photonic band gap structure having an internal surface coated with a film formed of a plurality of molecules, and a core region containing a sample fluid in which a plurality of microorganisms are dispersed, wherein the microorganisms are capable of interacting with the plurality of molecules so as to generate a fluorescent signal, in response to excitation light, and wherein the photonic band gap structure being further adapted to guide the generated fluorescent signal through the core region and onto the detector.

Because the proposed combination of Grey and Broeng does not teach or suggest all the elements of independent claim 1, the proposed combination is not a proper basis for an obviousness rejection of claim 1, or of any claim depending on claim 1.

B) There Is no Suggestion, Teaching, or Motivation to Combine the Documents (Grey and Broeng) on which the Examiner's Rejection is Based

Applicant submits that, not only does the proposed combination of Grey and Broeng fail to teach or suggest all the limitations of claims 1, 3-9, and 11-20, but also there is no suggestion within the cited documents Grey and Broeng of any desirability of making such a combination, nor is there any teaching or motivation for such a

combination.

It is well established that the Examiner must provide some suggestion of the desirability of doing what the inventor has done, without the benefit of impermissible hindsight. See MPEP 2142 and In Re San Su Lee, 277 F.3d at 1338: "*The initial burden is on the Examiner to provide some suggestion of the desirability of doing what the inventor has done.*" The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. In re Mills, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990). See MPEP 2143.01. It is also well established that, in order for a *prima facie* case of obviousness to be established, the teaching or suggestion to make the claimed combination must be found in the prior art itself, or in the knowledge of one skilled in the art at the time of the invention, and not based on applicant's disclosure. In Re San Su Lee, 277 F.3d 1338 (CAFC 2002) ("[T]*he evidence of record must identify an objective source of the motivation to combine A with B in the manner proposed.*") See also MPEP §§ 2141 – 2142.

Applicant respectfully submits that the record does not establish the requisite motivation for combining Grey with Broeng, and that nowhere in the Grey and Broeng documents themselves is there any suggestion of the desirability of making the proposed combination.

The Examiner states: *The reference of Broeng et al. discloses that it is known in the art to employ photonic band gap optical fibers in sensor applications because of the advantages associated with these structures over conventional fiber optical waveguides (See pages 1-7). The reference discloses providing a void in the fiber and means for providing a sample gas or liquid in the void (See pages 19-20). In view of this teaching, it would have been obvious to one of ordinary skill in the art at the time the invention was made to employ a photonic band gap structure in place of the conventional cladded optical fiber of the primary reference for the known and expected advantages associated with the photonic band gap structure as discussed by the reference of*

Broeng et al.

The above comments by the Examiner are irrelevant for Applicant's claims, because independent claim 1 does not merely recite using a photonic band gap optical fiber in sensor applications, and providing a void in the fiber, but contains many additional limitations (described above), none of which are taught or suggested by the combination of Grey and Broeng. Applicant further submits that these statements by the Examiner do not provide any suggestion as to why the particular proposed combination of references would result in Applicant's invention, and why it would be desirable.

As explained above, the proposed combination of Grey and Broeng, namely replacing the optical fiber in Grey with a photonic band gap structure of Broeng, does not result in the subject matter of Applicant's independent claim 1. Applicant's invention is not limited merely to the substitution of a photonic band gap waveguide for an optical fiber waveguide in the detection system of Grey: such a substitution does not result in Applicant's invention as defined by the required limitations of claim 1. Applicant's claim 1 requires, *inter alia*, the coating of an internal surface of the core region of a photonic band gap fiber with a thin film of molecules, and generating excitation light directed to a sample fluid (having microorganisms dispersed therein) contained within the core region so as to cause an interaction between the molecules and the micororganisms in a way as to generate fluorescent light.

In sum, there is no teaching, suggestion, or motivation to combine Grey and Broeng, either in the references themselves nor in the knowledge generally available in the art, and therefore the burden of providing a suggestion of the desirability of making the proposed combination has not been met. Further, even if the references were so combined, the proposed combination does not teach all the elements of Applicant's claim 1.

For all of the reasons discussed above, Applicant respectfully submits that the

Examiner has failed to establish a *prima facie* case of obviousness, and that there is no proper basis for the 35 U.S.C. §103 rejection of independent claim 1, or of claims 3-9 and 11-20 depending thereon, all of which are not rendered obvious by Grey and Broeng, either alone or in combination.

5. Rejection of Claims 1-5, 7-13, 16-20 Under 35 U.S.C. § 103 (a)

Claims 1-5, 7-13, and 16-20 have been rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Pat. No. 5,496,700 to Ligler et al. ("Ligler") in view of Broeng.

Applicant submits that the Examiner's rejection of claims 1-5, 7-13, and 16-20 over Ligler in view of Broeng does not establish a *prima facie* case of obviousness, at least because

A) The prior art reference(s) do not teach or suggest all of the elements and limitations recited in the claims; and

B) There is no suggestion, teaching, or motivation to combine the references on which the rejection is based.

A) The Documents cited by the Examiner (Ligler and Broeng), Either Alone or in Combination, Fail to Teach or Suggest All of the Elements of Claims 1-5, 7-13, 16-20, 22, and 23

Applicant respectfully submits that neither Ligler nor Broeng, either alone or in combination, teaches or suggests the subject matter of independent claims 1-5, 7-13, and 16-20. In particular, Applicant submits that the combination of Ligler and Broeng fails to teach or suggest at least a photonic band gap structure having an internal surface coated with a film formed of a plurality of molecules, and a core region containing a sample fluid in which a plurality of microorganisms are dispersed. Ligler and Broeng (either alone or in combination) also fail to teach or suggest that, in response to excitation light, the microorganisms are capable of interacting with the plurality of molecules so as to generate a fluorescent signal, and that the photonic band gap structure being further adapted to guide the generated fluorescent signal through the core region and onto the detector.

The Examiner has acknowledged that Ligler does not teach or suggest the above. See Office Action page 5, lines 6-8 ("*The above claims differ [from Ligler] by reciting the use of a photonic band gap structure with an internal core region for supporting the coated molecules wherein the sample fluid is contacted or contained within the core region.*").

Ligler, which is directed to an optical immunoassay system for detecting the presence of microbial analytes in a sample, also does not teach or suggest generating of a fluorescent signal through the interaction (in response to excitation light) of the molecules, coated onto the internal surface of a core region of a photonic band gap structure, with microorganisms dispersed within the sample fluid contained within in the core region.

The Examiner has also acknowledged that Ligler fails to teach the interaction of microorganisms with a film of molecules in response to an excitation light: "*. . . the reference of Ligler et al. is drawn to the detection of microbiological agents. Neither of these references [Grey and Ligler] convey to one of ordinary skill in the art that either of the detected analytes "interact" with a film of molecules "in response to an excitation light". No working examples are provided to provide such missing information.*" Office Action p. 3 line 22 – p. 4 line 4.

Broeng fails to correct for the above deficiencies of Ligler. In particular, Broeng fails to teach or suggest a photonic band gap structure whose internal surface defines an internal core region that contains microorganisms capable of interacting with the molecules of a thin film coating the internal surface, so as to generate a fluorescent signal. Broeng also fails to teach or suggest that a photonic band gap structure be adapted to guide a fluorescent signal, which is generated by an interaction between the microorganism and the molecules of the thin film coating the interior surface of the PBG structure, through a core region of the photonic band gap structure and onto an optical detector.

Because the proposed combination of Ligler and Broeng does not teach or suggest all the elements of claim 1, the proposed combination is not a proper basis for an obviousness rejection of claim 1.

B) There is no Suggestion, Teaching, or Motivation to Combine the Documents (Ligler and Broeng) on which the Examiner's Rejection is Based, and such a Combination Improperly Changes the Principle of Operation of Ligler

Not only does the proposed combination of Ligler and Broeng fail to teach or suggest all the limitations of claim 1, but also there is no suggestion, teaching, or motivation to combine the Ligler and Broeng documents in the manner proposed by the Examiner.

As explained in section 3 B), the Examiner has the initial burden of providing some suggestion of the desirability of doing what the inventor has done, without the benefit of impermissible hindsight. It is also well established that, in order for a *prima facie* case of obviousness to be established, the teaching or suggestion to make the claimed combination must be found either in the prior art itself, or in the knowledge of one skilled in the art at the time of the invention, and cannot not based on applicant's disclosure. The evidence of record must identify an objective source of the motivation to combine A with B in the manner proposed.

The fact that substituting a photonic band gap waveguide for an optical fiber waveguide is advantageous does not suggest the desirability of combining the **Ligler** and **Broeng** documents, the combination of which does not result in Applicant's invention, in any case.

Merely substituting a photonic band gap waveguide (disclosed in Broeng) for the optical fiber waveguide of Ligler, as suggested by the Examiner, does not result in Applicant's invention. The result of such a combination lacks at least an internal surface of a core region of the photonic band gap structure that is coated with molecules, and microorganisms dispersed in a sample fluid contained in the core region

that interact with the molecules in response to excitation light to generate a fluorescent signal. The combination also fails to teach or suggest using a photonic band gap waveguide to guide the fluorescent signal (generated in this manner), onto a fluorescence detector.

For all of the reasons discussed above, Applicant respectfully submits that the Examiner has failed to establish a *prima facie* case of obviousness, and that there is no proper basis for the 35 U.S.C. §103 rejection of independent claim 1 which is not rendered obvious by Ligler and Broeng, either alone or in combination. Applicant submits that independent claim 1 is allowable, and that claims 2-5, 7-13, and 16-20 (which depend on claim 1 and hence include all the limitations of claim 1) are allowable, at least because they depend from an allowable base claim.

6. **Rejection of Claim 21 Under 35 U.S.C. § 103 (a)**

Claim 21 has been rejected under 35 U.S.C. 103(a) as being unpatentable over Grey in view of Broeng taken further in view of either U.S. Pat. No. 5,250,264 to Walt et al. ("Walt") or U.S. Pat. No. 5,690,894 to Pinkel et al. ("Pinkel").

Applicant respectfully traverses, and submits that neither Grey nor Broeng nor Walt nor Pinkel, alone or in combination, teaches or suggests the subject matter recited in claim 21.

In particular, the combination of these references fails to teach, mention, or suggest an array of photonic band gap fibers, each photonic band gap fiber including an internal surface that defines a hollow core region, each internal surface of each photonic band gap fiber is coated with a film formed of a plurality of conjugated polymer molecules, wherein in response to said excitation light at least one of said plurality of sample organisms is capable of binding with at least one of said plurality of conjugated polymer molecules so as to generate a fluorescence signal; and wherein each photonic band gap fiber is adapted to guide said fluorescence signal through said core region and onto said detector for detection by said detector.

For reasons already discussed above, the combination of **Grey** and **Broeng** fails to teach or suggest any coating of molecules onto an internal surface of a PBG structure so that upon directing of excitation light onto substances of interest (microorganism), they interact with these coated molecules so as to generate a fluorescent signal. Neither **Walt** not **Pinkel** corrects this deficiency, because neither reference teaches these features of Applicant's invention, as acknowledged by the Examiner, who stated in earlier Office Action (e.g. in page 16, lines 11-13 of the Office Action) that "*The references of Walt et al. and Pinkel et al. where cited merely as tertiary references that disclose to one of ordinary skill in the art that the use of arrays of optical sensing devices is conventional in the art.*"

As acknowledged by the Examiner, therefore, there is no teaching, suggestion, or mention in Walt or Pinkel (either alone or in combination) of coating of an internal surface of a core region of a photonic band gap fiber with a film formed of molecules, generating a fluorescent signal by the interaction of microorganisms dispersed within a fluid in the core region with the molecules; and guiding such a fluorescent signal onto a detector by the photonic band gap fiber. Therefore, neither Walt nor Pinkel corrects the above-mentioned deficiencies of the combination of Grey and Broeng.

For these reasons, the combination of Grey, Broeng, Walt and Pinkel fails to teach or suggest all the elements of claim 21.

Also, nowhere in the four cited documents (Grey, Broeng, Walt and Pinkel), and nowhere in the knowledge generally available to one skilled in the art, is there any teaching or suggestion of the desirability of making such a combination of the four references (which does not result in Applicant's invention, in any event).

For these reasons, Applicant submits that the Examiner has failed to establish a *prima facie* case of obviousness, and that there is no proper basis for the 35 U.S.C. §

103 rejection of claim 21, which is not rendered obvious by Grey, Broeng, Walt, and Pinkel, either alone or in combination. Applicant respectfully submits that claim 21 is allowable.

7. **Rejection of Claim 21 Under 35 U.S.C. § 103 (a)**

Claim 21 has been rejected under 35 U.S.C. 103(a) as being unpatentable over **Ligler** in view of **Broeng** taken further in view of either **Walt** or **Pinkel**. Applicant respectfully traverses.

Applicant submits that the proposed combination of references (Ligler, Broeng, Walt/Pinkel) fails to teach or suggest all the elements of claim 21. Applicant further submits that the Examiner failed to meet his burden of providing some suggestion of the desirability of making such a combination.

The proposed combination of Ligler, Broeng, Walt and Pinkel fails to teach or suggest at least an array of photonic band gap fibers, each photonic band gap fiber including an internal surface that defines a hollow core region, each internal surface of each photonic band gap fiber is coated with a film formed of a plurality of conjugated polymer molecules, wherein in response to said excitation light at least one of said plurality of sample organisms is capable of binding with at least one of said plurality of conjugated polymer molecules so as to generate a fluorescence signal; and wherein each photonic band gap fiber is adapted to guide said fluorescence signal through said core region and onto said detector for detection by said detector.

As discussed above, the combination of Ligler and Broeng fails to teach or suggest the features set forth in the previous paragraph. Both Walt and Pinkel fail to correct this deficiency. There is no teaching, suggestion, or mention in both Walt and Pinkel, either alone or in combination, of: 1) the generation of a fluorescent signal by the interaction of microorganisms with the molecules forming a film that coats an internal surface of a core region of a photonic band gap fiber; and 2) the guidance of

such a fluorescent signal onto a detector by the photonic band gap fiber.

Further, there is no motivation or any suggestion of the desirability of making such a combination, either in the references themselves, or in the knowledge available to one of ordinary skill in the art.

Accordingly, Applicant submits that the Examiner has failed to establish a *prima facie* case of obviousness, because 1) nowhere in any of the cited references (Ligler, Broeng, Walt, Pinkel), and nowhere in the knowledge available to one of ordinary skill in the art, is there any suggestion, teaching, or motivation to combine the references on which the rejection is based; and 2) even if the references were so combined, the combination of Ligler, Broeng, Walt, and Pinkel fails to teach all of the elements and limitations recited in claim 21, as explained above.

For these reasons, it is submitted that there is no proper basis for the 35 U.S.C. § 103 rejection of claim 21, which is not rendered obvious by Ligler, Broeng, Walt, and Pinkel, either alone or in combination, and is allowable.

8. Conclusion

On the basis of the foregoing amendments, Applicant respectfully submits that all of the pending claims 1-21 are in condition for allowance. An early and favorable action is therefore earnestly solicited. If there are any questions regarding these amendments and remarks, the Examiner is encouraged to contact the undersigned at the telephone number provided below.

Respectfully submitted,

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